

Spaceport News

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Endeavour earns piggyback ride back to KSC

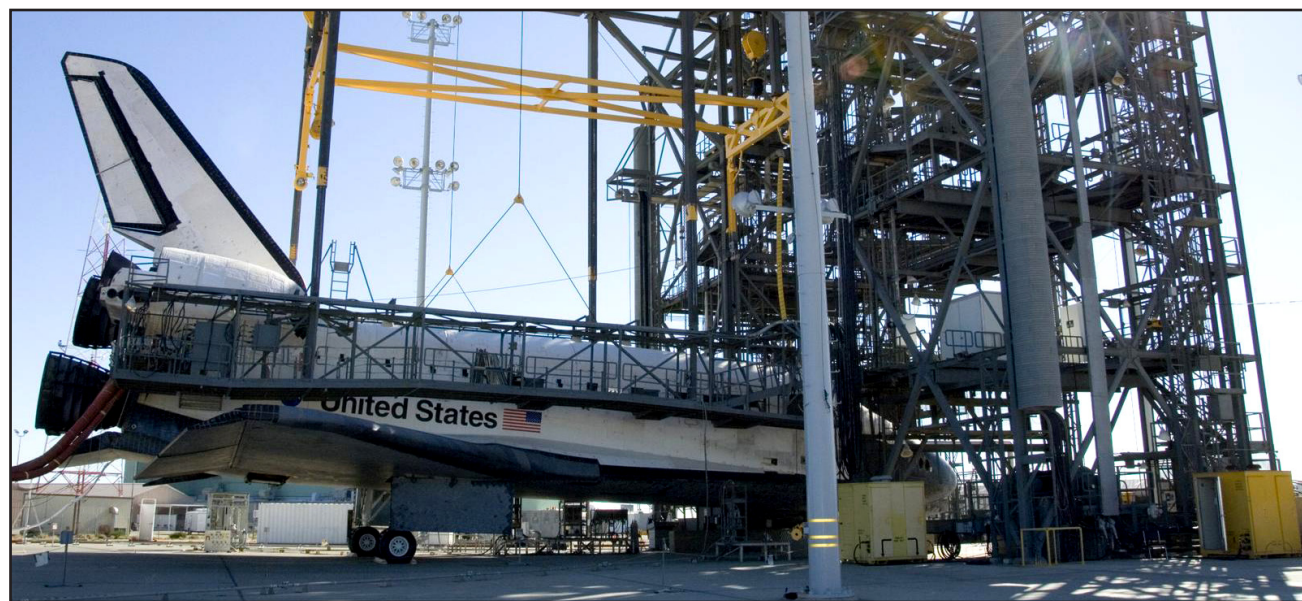
Don't let the desert fool you. It's not always hot. In fact, in California's Mojave Desert where NASA and contractor employees are processing space shuttle Endeavour, it's freezing.

"It's 32 degrees out here," said Ken Tenbusch, Endeavour flow director. "Not easy when your teeth are chattering."

One of the major differences in processing at NASA's Kennedy Space Center in Florida and NASA's Dryden Flight Research Center in California is location.

Within hours of landing at Kennedy, Endeavour would have been towed into one of the center's orbiter processing facilities -- a place where technicians have all of the resources they need right at their fingertips. But at Dryden, Endeavour is processed outdoors at the Mate-De-mate Device with limited resources.

"Processing outdoors offers many challenges," Tenbusch said. "Over here,



NASA/Tony Landis

Space shuttle Endeavour was nestled in the Mate-DeMate Device at Dryden Flight Research Center, as preparations were made for its ferry flight to Kennedy Space Center. Endeavour will fly atop a modified 747 as it takes off from Edwards Air Force Base. Dryden is adjacent to Edwards in the Mojave Desert northeast of Los Angeles.

you are completely open to the environment. The wind comes right off of the mountains and if it rains, you're getting rained on."

The way orbiters are processed is different, too.

At Dryden, crews basically have to winterize the vehicle before it's bolted to a 747 jumbo jet called the Shuttle Carrier Aircraft. Technicians power the orbiter down, safe all

the hypergolic propellants and fuel systems, drain the water systems and close the nose and landing gear doors. Then, they install a large cone on the tail of the orbiter, which helps smooth the airflow around it during the ferry flight.

"In order to do that, you have to manipulate the engines and bring them together so the cone will fit over the top of them," said

Randy Goodman, Endeavour flow manager.

To perform these turnaround operations, about 250 NASA and contractor employees are working around the clock. Meanwhile, there are several systems engineers at Kennedy who can't wait to get their hands on Endeavour.

"You can explain and

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More online

For more information on space shuttle Endeavour's ferry flight from Edwards Air Force Base to Kennedy Space Center on the back of a modified 747, and for complete coverage of the shuttle program, including photos and videos, go to: www.nasa.gov/shuttle

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Cabana, cosmonaut entered ISS 10 years ago

By Cheryl Mansfield
Spaceport News

Slightly more than 10 years ago on Dec. 4, 1998, NASA and its partner nations began building a dream: the International Space Station. On that date, space shuttle Endeavour lifted off on its 12-day mission to deliver NASA's Unity module and connect it to Russia's Zarya control module already orbiting Earth.

The commander of that first space shuttle construction flight to the station was astronaut Bob Cabana -- now director of Kennedy Space Center.

Cabana recalls vividly that first trip to the fledgling station, when he and Russian cosmonaut Sergei Krikalev prepared to be the first crew members to enter the newly joined modules.

"We finally got all the hatches open and we're up to the main hatch going into Node 1 (Unity). We open the hatch and Sergei Krikalev was with me. I just waved my hand toward the hatch and the two of us entered together," says Cabana. "I think what it talks about on the space station is international cooperation. You know, there wasn't a first person in. We went in together."

Despite his unique place in space station history, it is the sense of international cooperation that continues to impress Cabana.

"When you look at Japan, Canada, the European space agency and all its partners, Russia. You take all those different cultures, people and hardware built around the world and it comes together for the first time on orbit and it works flawlessly -- that's phenomenal," he says. "The engineering of it is phenomenal. But when you throw in the cultural differences and that we have worked together in space as partners through some tough times and some easier times for 10 years now -- that's amazing."

As the station's construction nears completion, Cabana reflects on the continuing work aboard the station.

"Right now, 24 hours a day seven days a week, 365 days a year, we have humans in space exploring



NASA file

Cosmonaut Sergei Krikalev, left, and space shuttle Commander Bob Cabana work near the hatch of the Russian Zarya module. The International Space Station started its journey at 3:25 p.m. EST on Dec. 13, 1998, when Endeavour released the Zarya and Unity modules.

Q&A with Bob Cabana



www.nasa.gov/mission_pages/station/behindscenes/construction_Q-A.html

-- exploring how to work in that microgravity environment in space. In that harsh environment where it can be as cold as minus 150 F or as hot as 300 degrees," he explains. "We're making things work. We're doing real science. We're going to do more science when we get a larger crew up there. We're proving the systems that we need. We have an excellent international cooperative partnership."

Cabana concludes, "I think folks need to know that we can work together. That it's not just when the shuttle launches. There's a crew up there right now doing real work in space."



NASA file

The onboard camera of space shuttle Endeavour captures the Russian control module Zarya and the U.S. Unity connecting module after they were joined in the shuttle's cargo bay. Endeavour chased Zarya for two days before its arm pulled the Russian-built module into linking position.

Shuttle workers learn COPV inspection techniques

By Linda Herridge
Spaceport News

During a two-day training session at Kennedy Space Center, shuttle and safety workers learned how to detect damage to composite overwrapped pressure vessels, or COPVs, which hold pressurized helium or nitrogen. About 24 of these pressurized vessels are used in the space shuttle's main propulsion system, the orbital maneuvering system, the reaction control system and the environmental control and life support system during each space shuttle mission.

Though some COPVs are wrapped in a carbon fiber, those on the space shuttle are wrapped with a strong, heat-resistant fiber called Kevlar. Cylindrical in shape, the shuttle's COPVs have a thin titanium and alu-



NASA/Dimitri Gerondidakis

The space shuttle has 24 Kevlar-wrapped composite overwrapped pressure vessels to store helium and nitrogen gasses. To learn more about the COPVs and view where they are located on the space shuttle, go to <http://spaceflightsystems.grc.nasa.gov/SpaceOps/Shuttle/COPV/>.

minum alloy liner embedded about 1,000 miles of fiber string and are coated in a carbon epoxy.

Training instructor Tommy Yoder said the ves-

sels are half as heavy and twice as strong as metal pressure vessels. "Lighter weight makes them extremely desirable," said Yoder, who is the COPV

group project leader with Jacobs Engineering at Johnson Space Center's White Sands Test Facility in New Mexico. This is his fifth training session at Kennedy in a little more than a year.

The training course focused on detection methods with hands-on visual inspections of actual flight hardware. Other topics were damage mechanisms, progressive failure analysis, impact control and protection, receiving and periodic inspections and inspection techniques.

"The hands-on training is so important in order to meet NASA's requirements for safety and mission assurance," Yoder said. "It's important to detect COPV damage before they are used on aerospace missions." Yoder said damage could occur during manufacturing, delivery or handling before a shuttle flight.

NASA Safety Engineer Andrew Stampfel participated in the classes. He said every Kennedy worker who is involved in the ground processing of COPVs should handle them with

"COPVs are a fairly new technology, but are quickly becoming the standard in space travel."

**Andrew Stampfel,
NASA safety
engineer
at Kennedy**

care so they will not become damaged and to be aware of the detection methods used in order to extend the life of the tanks in space.

"COPVs are a fairly new technology, but are quickly becoming the standard in space travel," Stampfel said. "They need to be handled and inspected using different techniques."

Yoder said every launch vehicle, including the Ares I, will use COPVs for pressure storage, making this training very necessary.



NASA/Dimitri Gerondidakis

Composite Overwrapped Pressure Vessel Group Lead Tommy Yoder describes stress rupture damage to a COPV to a group of students at Kennedy Space Center's Training Auditorium on Dec. 4.

Scenes Around Kennedy Space Center



NASA/Jack Pfaller

United Space Alliance Senior Aero Composite technicians Dior Hubel, left, and Marcia Jones-Clark pack a colorful main parachute slated for use on the Ares I-X test flight in the Parachute Refurbishment Facility at Kennedy Space Center. The new parachutes are red, white and blue. Ares I-X is targeted to launch July 2009 from Launch Pad 39B.



NASA/Cory Huston

Suspended by a crane in the Space Station Processing Facility at Kennedy Space Center, the Cupola module is lowered toward the workstand. Cupola, which is scheduled for launch on space shuttle Endeavour's STS-130 mission, will provide a 360-degree panoramic view of activities outside the station and spectacular views of Earth. STS-130 is targeted for liftoff Dec. 10, 2009.



NASA/Dimitri Gerondidakis

Center Director Bob Cabana hands over an Unsung Hero Award from the Blue Angels to EG&G Aircraft Servicer Kurt Asche, as EG&G Airfield Services Branch Manager Bob Bryan, looks on. The event took place Dec. 4 at Kennedy Space Center's Shuttle Landing Facility.



NASA/Jack Pfaller

External Tank 130, which will be used on the Hubble servicing mission, STS-125, rolls toward the Vehicle Assembly Building after arriving Dec. 4. The Pegasus barge transported the fuel tank from the Michoud Assembly Facility in New Orleans. The fuel tank was previously designated for the STS-127 mission.



For NASA

The Expendable Launch Vehicle Integrated Support Team, or ELVIS, consisting of Analex/QinetiQ Corp, a.i. solutions, SAIC and its NASA-LSP customer, hosted its sixth annual Thanksgiving food drive. The group teams up with North Brevard Charities & Sharing Center, which provides food baskets for families.

2008 Kennedy Space Center Holiday Coffee



NASA/Amanda Diller

Kennedy Space Center workers attended one of the annual Holiday Coffees in the Mission Briefing Room at Operations & Checkout Building. Center Director Bob Cabana attended both Holiday Coffees that day.



NASA/Kim Shiftlett

Workers attended one of the annual Holiday Coffees in the 5th Floor Conference Room in the Operations Support Building II on Dec. 12.

Spaceport News wants your photos

Send photos of yourself and/or your co-workers in action for possible publication. Photos should include a short caption describing what's going on, with names and job titles, from left to right. Send your photos to:

KSC-Spaceport-News@mail.nasa.gov



NASA/Kim Shiflett

Chief Petty Officer Mark Carstens stands near a Coast Guard 25-foot response boat at Port Canaveral. The boat is one of several the Coast Guard uses to patrol the port, the inter-coastal waterways and offshore.

Coast Guard keeps eye on spaceport's waterways

By Linda Herridge
Spaceport News

While space buffs looked skyward anticipating Endeavour's launch on the STS-126 mission last month, the U.S. Coast Guard patrolled the waterways around Kennedy Space Center and Cape Canaveral Air Force Station. As launch countdown progressed, a Coast Guard HU-25 aircraft flew down range to remain near the solid rocket booster drop zone.

About 100 support personnel monitored an area encompassing roughly 230 square miles, from Mosquito Lagoon north, to NASA Causeway south, and from the Banana River east, to three miles off the Atlantic coastline, to ensure the area

"(The Coast Guard has) evolved over the years to support NASA's needs and homeland security changes. The process needs to be transparent."

Chief Petty Officer Mark Carstens,
United States Coast Guard

was cleared of any personal and commercial watercraft.

According to Chief Petty Officer Mark Carstens, the Coast Guard's normal daily duties include patrolling and monitoring 2,250 square miles offshore, 24/7, each day of the year. The patrol area covers 40 miles offshore and 50 miles along Florida's coastline, from Mosquito Lagoon to Palm Bay.

The Coast Guard provides security and safety

zone enforcement up to four days prior to launch. Active duty, reserve and auxiliary Coast Guard shuttle support personnel begin continuous patrols 12 hours before launch, using an 87-foot Coast Guard Cutter, a 47-foot motored life boat, two 25-foot response boats, and 18- and 23-foot utility boats.

During the final 45 minutes before launch, the Coast Guard expands its safety zone to 12 miles offshore and enlists support

from the U.S. Customs and Border Patrol, the Florida Fish and Wildlife Commission and the Brevard County Sheriff's Office. Coast Guard personnel also assist the surveillance control officer in the Morrell Operations Control Center at Cape Canaveral Air Force Station.

"We all work together to protect our valuable U.S. assets," Carstens said. "The Coast Guard is very proud to serve the country and have the opportunity to

perform this mission."

Stationed at Port Canaveral since 1976, the Coast Guard has supported NASA's mission for more than 25 years, including the agency's Launch Services Program.

Its legacy missions include boarding vessels, patrolling port waterways and supporting Navy vessels.

"We've evolved over the years to support NASA's needs and homeland security changes," Carstens said. "The process needs to be transparent."

For NASA's Ares I-X test flight, the Coast Guard will provide security and safety zone support for launch of the rocket. Carstens said there are some unique security challenges for the agency's future Mars Science Laboratory launch.

Remembering Our Heritage

Gordo proved humans could survive journey

By Kay Grinter
Reference Librarian

Mercury astronaut Gordon Cooper was not the first "Gordo" to fly in space. Paving the way for the first human launches was a bevy of critter astronauts, including a diminutive, one-pound squirrel monkey dubbed Gordo.

Primate Gordo was the living cargo on the Bioflight I launch from Cape Canaveral Air Force Station's Launch Complex 26 on Dec. 13, 1958, 50 years ago.

Bioflight I was not a NASA mission, but rather the responsibility of the Army Ballistic Missile Agency, or ABMA. Contemplating the possibility of men riding rockets into space, the U.S. Army's Office of the Surgeon General proposed a program of biological flights that would serve several purposes.

The first suborbital rocket-powered animal flight was in June 1948 when an anesthetized monkey named Albert launched aboard a V2 rocket at White Sands, New Mexico. However, none of the animal payloads used in the project were recovered alive because of mechanical failures.

The new bioflights were designed to collect data on the physiological response of conscious primates during ballistic rocket flights into space. These flights would demonstrate whether living creatures could survive unharmed if adequate life-support systems were provided and whether their capsules could be quickly located and recovered after an ocean splashdown.

The flights also would help the Army develop missile countdown and launch-



Courtesy of Redstone Arsenal

Gordo, also called Old Reliable, launched aboard a Jupiter Intermediate Range Ballistic Missile rocket on Dec. 13, 1958.

ing procedures. The rocket chosen for Gordo's launch was a U.S. Army Jupiter Intermediate Range Ballistic Missile, fitted with a modified nose cone.

The heated Bioflight I capsule was developed and tested at the U.S. Navy's School of Aviation Medicine in Pensacola, Fla., with design assistance provided by the ABMA. The fully-instrumented capsule was custom-built to contain Gordo's cylinder container and fit into the bottom section of the rocket's nose cone for easy access. Covered with insulating foil and fiberglass, it held the couch-restrained monkey,

as well as his life-support systems and monitoring equipment.

During his training, Gordo was known as "Old Reliable," due to his ability to learn quickly. It also happened that the highly dependable Jupiter rockets, the same type that would carry him, were commonly referred to by that name.

Four days prior to launch, two flight-ready capsules and six monkeys were transported by Navy personnel from Pensacola to Cape Canaveral. Then, 11 hours before the scheduled liftoff, two teams of doctors selected a pair of monkeys with the best overall perfor-

mance during training: one to fly the mission, the other for backup.

At this time, the prime candidate for the flight was assigned the name "Gordo," phonetically much better suited for communications.

For flight, Gordo wore a chamois leather-lined plastic helmet made of molded plastic compound and strapped onto an individually-fitted silicon rubber couch. The couch was covered by a thin sheet of foam rubber with a built-in microphone to monitor his heartbeat. A thermistor, used to measure body temperature, was placed under one of his armpits and a respi-

ratory sensing device was secured with model glue just above his nostrils.

Small straps extending from Gordo's helmet were secured onto rubber posts that formed part of his molded bed in order to immobilize his head, after which further foam rubber overlays were secured across his body. Gordo's knees had been drawn up in a supine position, which would allow him to cope better when undergoing the stresses associated with acceleration.

Following liftoff at 3:38 a.m. EST, telemetry indicated that Gordo experienced around 10 g's of acceleration, which slowed his respiratory rate and caused his pulse rate to fluctuate and then speed up. During an estimated nine minutes of weightlessness, these readings returned to normal, and he made an otherwise uneventful quarter-hour flight through space.

The capsule splashed down in the Atlantic Ocean, over 1,500 miles downrange from Cape Canaveral, but unfortunately, the recovery ship was unable to pick up its signal. A parachute malfunction or a mechanical failure in the flotation system may have been the cause. The search was abandoned after six hours.

Gordo gave his life for space research, but it was not in vain. After examining data from the flight, Navy doctors reported that the respiratory and heartbeat data transmitted indicated humans could survive a similar journey.

Note: The author used excerpts from the book "Animals in Space: From Research Rockets to the Space Shuttle," by Colin Burgess and Chris Dubbs.

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send pictures -- but it's clearly not the same as being next to the hardware," Tenbusch said.

Tenbusch and Goodmon say Endeavour appears to be in good shape. They even commented on the window that was hit by a meteor while orbiting Earth.

"The window is fine for the flight back to Kennedy," Goodmon said. "But it will be removed and replaced before Endeavour's next mission."

Even with the challenges,

Tenbusch says his turnaround team is doing a great job preparing Endeavour for its piggyback ride to Kennedy. And while many wonder if landing in California put Endeavour behind schedule for its next mission, targeted for May 2009, Tenbusch remains optimistic.

"There are ways to make up lost time. The two most prominent are overtime and diverting resources from one orbiter processing facility to another," Tenbusch said. "I truly believe the team will be able to respond well and make up the lost time."

NASA Employees of the Month: December



NASA

NASA employees of the Month of December are, from left, Robert Freeman, Constellation Project Office; William Bailey, Safety & Mission Assurance Directorate; Herbert Cook, Human Resources Office; Jennifer Rosenberger, Launch Vehicle Processing Directorate; and Jerry Barnes, Information Technology & Communications Services. Not pictured are: Donald Schiller, Chief Counsel; Luke Hoffman, Chief Financial Office; Kathleen Ellis, Engineering Directorate; Michael Dupuis, Engineering Directorate; Daniel Hull, Center Operations; and Jeffrey Ehrsam, Launch Services Program.

Looking up and ahead

No earlier than Dec. 16	Launch/CCAFS: Delta IV, NROL-26; TBD
Feb. 4, 2009	Launch/VAFB: Delta II, NOAA-N Prime; 5:22 a.m. EST
Target Feb. 12, 2009	Launch/KSC: Discovery, STS-119; 7:36 a.m.
No earlier than April 1, 2009	Launch/CCAFS: Delta II, STSS; TBD
No earlier than April 6, 2009	Launch/CCAFS: Delta IV, GOES-O; TBD
Scheduled for March 5, 2009	Launch/CCAFS: Delta II, Kepler; 10:48 p.m. EST
April 24, 2009	Launch/CCAFS: Atlas V, LRO/LCROSS; TBD
Target May 12, 2009	Launch/KSC: Atlantis, STS-125; 12:43 a.m.
Target May 15, 2009	Launch/KSC: Endeavour, STS-127; 4:52 p.m.
Target July 11, 2009	Launch/KSC: Ares I-X test flight/Launch Pad 39B; TBD
Target Aug. 6, 2009	Launch/KSC: Atlantis, STS-128; TBD
Target Nov. 12, 2009	Launch/KSC: Discovery, STS-129; TBD
Target Dec. 10, 2009	Launch/KSC: Endeavour, STS-130; TBD
Scheduled for Jan. 26, 2010	Launch/CCAFS: Atlas V, SDO; TBD
Target Feb. 11, 2010	Launch/KSC: Atlantis, STS-131; TBD
Target April 8, 2010	Launch/KSC: Discovery, STS-132; TBD
Target May 31, 2010	Launch/KSC: Endeavour, STS-133; TBD

WORD ON THE STREET

What are your plans for the holidays?



"I will be at the SLF. We'll have someone out here keeping an eye out for Santa Claus."

Ron Feile,
with EG&G Technical Services

"Spend time with the family in Orlando and Tampa. We swap parents every year."

Steve Anthony,
with NASA



"I'm going to hang out with my kids and do the family thing."

Robert Brantley,
with United Space Alliance

"I'm going to spend time with the family in Daytona on the beach . . . weather permitting."

Jimmy Dean,
with Space Gateway Support Fire



"Stay home and work on the farm in Titusville. My wife does physical therapy with kids."

James Moye,
with Abacus Technology Corp.



John F. Kennedy Space Center

Spaceport News

Spaceport News is an official publication of the Kennedy Space Center and is published on alternate Fridays by External Relations in the interest of KSC civil service and contractor employees.

Contributions are welcome and should be submitted **three weeks** before publication to the Media Services Branch, IMCS-440. E-mail submissions can be sent to **KSC-Spaceport-News@mail.nasa.gov**

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Editor Frank Ochoa-Gonzales
Copy editor Rebecca Sprague

Editorial support provided by Abacus Technology Corp. Writers Group.
NASA at KSC is on the Internet at www.nasa.gov/kennedy
USGPO: 733-049/600142